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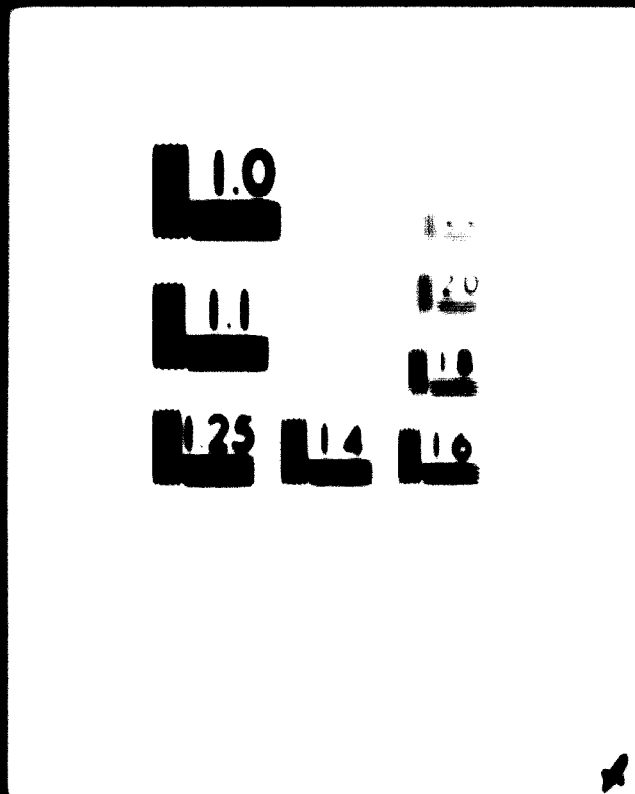
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RESEARCH REPORT
No. 12, 1950
Date: May 1950

RECOGNITION OF NEW AGRICULTURAL EQUIPMENT

in
1949

AND OF AGRICULTURAL EQUIPMENT FACTORY

by
J. A. JENNINGS

of
M. A. A. AGRICULTURE
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**GENERAL REPORT
NO. P.A./1970/12**

Date: May 1970

RECONSTRUCTION OF NEW AGRICULTURAL EQUIPMENT

in

IRAQ

and the

ROLE OF KHADIMIA INDEPENDENT FACTORY

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**(The views expressed in this report and recommendations made are personal
to the (the author)**

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ABSTRACT

This report is one of the series of technical reports and working papers prepared during the course of UNDP/UNRWA project EAG-72/013 (Agricultural Machinery Design - Development and Product Performance Evaluation) and is based on preliminary studies carried out by the Testing-Development Division in the State Company for Mechanical Industries in Iskandariya.

In view of lack of national activities on tests, popularization etc. of agricultural machines and implementing ^{and} problems of surplus manufacturing capacity faced by the Iskandariya factory, in this report emphasis is given to a programme for import, adaptation and sale of equipment by the Iskandariya factory which is essential for generating a demand for the different equipment required for an efficient agriculture, and at the same time to enable the Iskandariya factory to identify the designs and types of equipment that may be taken up for production.

Some of the aspects requiring special attention that would enable the Iskandariya factory to more effectively contribute to the agricultural mechanization of Iraq are also discussed.

The observations and recommendations made are based on information that have become available to the authors at the time of preparation of this report and may require modifications in the light of additional information that may become available. On some of the aspects discussed in the report there is a need for detailed investigations and studies, which it is hoped will be organized.

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The authors are grateful to Mr. Latif Hassan Al-Dhuan, Director General of the State Company for Mechanical Industries in Iskandariya for the support given in undertaking this study. The co-operation and assistance given by the different Divisions and sections of the Iskandariya factory are greatly appreciated.

The observations made from time to time on the different agricultural operations at the Greater Hameeyib Project were of considerable value. The deep interest shown by Dr. Dhari Al-Hardan Director General of Hameeyib Project on mechanization aspects and useful discussions held with him and the officers of the Project especially Dr. Ashra Sultan, Director of Agricultural Affairs, Mr. Walid Fakhri Gellhanger UNDO/PAG project, the assistance given by them as well as Mr. John Pike, PAG Project Manager and Dr. Karim Nassouhi, FAO Irrigation Agronomist have been valuable.

RECOMMENDATIONS

The problem of surplus manufacturing capacity for agricultural implements in the State Company for Mechanical Industries in Iskenderiya (SMMI) and the poor sale of manufactured implements warrant urgent attention for applying remedial measures. The management of the Iskenderiya factory has taken and initiated a number of steps to improve the working of the factory so that the factory can contribute to the development of agricultural mechanization of Iraq and it to be an effective institution participating in the industrial development of the country.

2. Diversification of production to include in the manufacturing programme new agricultural equipment is essential. The present experience with some of the equipment shows that for avoiding risks in organizing production, the types of equipment and their designs have to be based on tests and trials, demand generated and factors restricting sales removed. It is therefore necessary for the Iskenderiya factory to take up imports, assembly, modification, and sale of selected items of equipment as a pre-production activity and for improving its sales turn over.

3. The types of equipment that are required to be introduced and popularized for an efficient agriculture are many, but answers to questions relevant to agricultural development which are important to the Iskenderiya factory in assigning priorities for a programme of development and production are lacking. Taking into account the various factors, the types of equipment that may be considered for a programme of import trials, sale, and generation of demand are given in Table-4. Broad specifications are given in Appendix-2.

4. Iskenderiya made tractors are sold and serviced by the dealers appointed by the State Machinery Import Company which acts as the sole distributor. A survey carried out shows that there is a lack of sales effort and after sale services. This is seriously affecting the sales, and in turn the manufacturing activity. It is therefore necessary for the SMMI as a manufacturer to be actively engaged in sales and sales promotion and take up sales by re-organizing the existing sales net-work.
(Para. 5.1)

5 Existing manufacturing method in which expensive jigs and fixtures are designed and made on an assumed sales volume even before conducting comprehensive tests, trials and user evaluation which are essential to ensure suitability of the product and its market acceptance increases the cost of production. Mass production techniques should be applied only when the product acceptance is established and demand is well developed. Low volume initial production for developing the market and for perfecting the design is necessary. As a strategy for diversification of production the SMI should concentrate on items for which a large demand exist or is developed. For meeting requirements of components that are needed in limited quantities or are expensive to be made in the factory, services of sub-contractors may be used and assistance to them may form part of the manufacturing activity of SMI. Even implements of simple design, low volume production of which by the SMI may not be economical may be got made by sub-contractors, the finished equipment to be sold as an SMI product. (Para 5.4 to 5.5)

6. In view of the programmes for manufacture of lorries, tractors etc., ancillary industries may be developed. (Para 5.9)

7. The number of implements in each type that may be considered for an initial programme of import assembly, sale and generation of demand is indicated in Table -4. The SMI should convene a meeting of representatives of the Ministry of Agriculture and Agrarian Reform and projects and organizations under it to ascertain the requirements, preferences and priorities for import, development and production of agricultural equipment. (Para 6.1 to 6.4)

8. A strategy for agricultural mechanization of Iraq is yet to be developed. Detailed studies on agricultural machines and implements that should be introduced and popularized for the different farming situations, the degree of mechanization that can or should be achieved in 5 to 7 years, the technical, financial and organizational resources that are now available and should be provided for fully meeting the agricultural needs of the country are lacking. Such studies are required to be carried out.

9. About I.D. 0.75 million out of the trading account would be required for meeting the working capital for initial imports. Servicing and demonstration teams should be organized and the Testing-Development-Research Division should be fully established and staff for testing and design adaptation should be augmented. (Para 7.3.3 to 7.3.5)

10. The very wide gap between existing production and production level to be achieved and the lack of national programmes that would enable the factory to plan realistically its production programmes make it necessary that till such time comprehensive programmes of agricultural mechanization are developed in which all component activities of research, development, production, training and other infra-structural needs for ensuring efficient utilization of agricultural equipment are given the necessary weightage, it is appropriate that the SMI is given a special grant for meeting the cost of trial, demonstration and popularization of agricultural equipment. (Para 8.2.3 to 8.2.5)

11. A parallel or supplementary programme to be implemented is the establishment of a National Farm Machinery Institute which for its quick establishment may utilize the facilities available at the Iskandariya factory and the Greater Hamegrib Project. Establishment of such an institute in view of its immediate need and long term benefits to Iraq should have priority amongst new projects to be taken up by the government.

12. To identify makes and types of equipment offering scope for introduction and manufacture in Iraq, to study manufacturing techniques, testing, development and related programmes, a visit of officers of Iskandariya factory etc., to other countries would be useful and such a visit may be sponsored by UNIDO. (Para 8.3)

13. Detailed manufacturing feasibility studies for equipment with good internal demand and export possibilities are necessary. Organization of production based on such studies would serve as a model, the experience gained to be applied to other products for diversifying manufacturing activities. A draft project data sheet for a pre-project activity with UNIDO assistance is given in Appendix - 3. (Para 8.4)

14. **Advanced steps are required for developing an export market for Iraq made implements. Besides collecting information on demand, import production etc., of implements in other countries in the region, demonstration and trial of Iraq made implements may be organized in selected countries. As a step towards promotion of regional co-operation on manufacture and marketing of agricultural equipment, a regional conference on the above may be sponsored by UNIDO in co-operation with the Industrial Development Center for Arab-States. Findings of the conference followed by discussions at Government level by a UNIDO-ICDS mission should identify fields for co-operative action for implementation. (Para 8.5)**

INDUSTRIAL DEVELOPMENT IN**IRAQ****AND THE ROLE OF INDUSTRIAL DEVELOPMENT FACTORY****I. INTRODUCTION.**

In this report agricultural equipment that are required to be introduced in Iraq for the different agricultural operations through a programme of import, assembly, modifications to design where necessary by the State Company for Mechanical Industries in Irbid (SMI) is discussed.

1.2. The objective of the programme is diversification of production. The immediate benefit would be diversification of activities of the SMI on assembly and sale of equipment that are required to be introduced and used for meeting the agricultural needs of Iraq.

1.3. The State Company for Mechanical Industries in Irbid at present is utilizing only about 50 percent of its manufacturing facilities. Diversification of production is therefore essential to utilize the surplus manufacturing capacity of the factory. Partial or full production of equipment has to be preceded by:

- (1) Identification of designs best suited to local conditions, their development and modifications to fully adapt them to local conditions.
- (2) Removal of agro-impliment constraints in the efficient utilization of equipment.
- (3) Generation of demand through demonstrations and publicity.

- (4) Assessment of trend in demand and selection of an economically viable programme for assembly and production.
- (5) Training of staff in operation, servicing and organization of facilities for providing after sale servicing.

1.4. The above could easily be achieved by a programme of initial import of implements developed in other countries with almost similar farming and usage conditions. This can be organized by the IRII.

1.5. A manufacturing strategy using components and assemblies manufactured by sub-contractors under the general guidance and supervision of IRII is also proposed to make initial low volume production economical. A programme for tests, evaluation and development of new equipment to be introduced and progressively manufactured has also been recommended.

1.6. The data given in the report and recommendations made are based on the information that have become available to the authors at the time of preparation of the report and may require modifications in the light of additional information that may become available.

II. AGRICULTURAL EQUIPMENT AT PRESENT IN THE IRRADIATION FACILITY

2.1. The major items of agricultural equipment in use in Iraq consist of heavy earth moving and construction equipment for land development, wheeled tractors and implements for tillage operations, combine harvesters for harvesting cereal crops and irrigation pumps. At present the population^(a) of some of the major agricultural equipment in use is about:

1. Wheeled tractors (50 to 90 hp)	13,000
2. Combine harvester threshers	2,500
3. Irrigation pumps	15,000

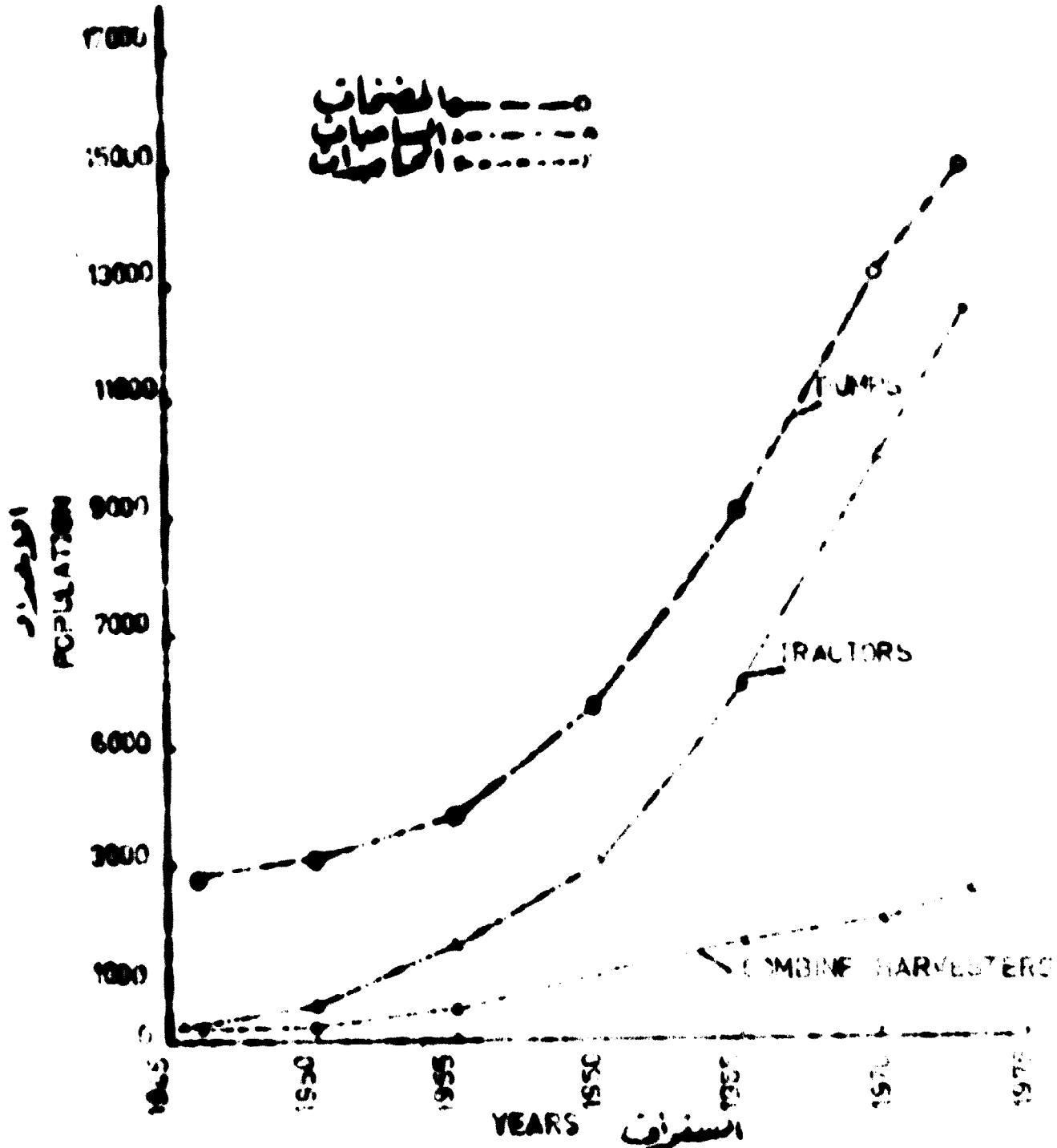
The growth in population of these equipment is given in Fig. 1.

^(a) In the absence of census figures, present population has been estimated from available data.

3

1.3. Except for tracked tractors and some of the implements which have been taken up for production/assembly in the USSR, the requirements of agricultural machinery is met out of imports. The manufacturing programme of USSR includes 60 to 65 % of tracked tractors and implements for them. The targets for production and actual production of implements during the year 1971-72 and 1972-73 and targets for 1973 are given on page 4, Table 1.

تكنولوجيا الزراعة في العراق



POPULATION GROWTH OF AG. MACHINERY IN IRAQ

PJZ/MEP

2.3. The implements included in the production programme of the IRI are essential for agricultural production in Iraq, but the experience with some of the items shows that the sale is low. With the steps being taken to fully adapt the implements in the manufacturing programme, to the wide range of soil and usage conditions in Iraq, programmes of market research, improvement of sales and servicing net work and development of an export market, improvement in sales turnover is bound to result. ~~However with a production programme limited to the types of equipment already taken up and without a sizeable export it will be several years before the surplus manufacturing capacity can be fully utilised. At the same time programmes for intensive agriculture, extension of area under irrigated farming and introduction of new crops call for a wide range of new agricultural equipment. To reduce dependence on imports all has to take advance steps leading to product~~

2.4. To fill the gap between demand and supply a number of implement manufacturers are currently engaged in the production of simple heavy duty cultivators, heavy duty harrows suitable for rainfed areas and such specialised equipment as potato diggers, feed mixing units etc. Their annual turnover is small and the quality of their products is poor.

2.5. It is in the above context that the IRI has to diversify its production to include new items of ~~equipment~~ required to be introduced with initial programme of import, modification, assembly, testing and development.

III. AGRICULTURAL PRODUCTION

3.1. The tentative programme for agricultural production for the year 1973-74 as compared to previous years envisage substantial increase in the area of all major crops: food and commercial crops such as potatoes, pomegranate, cotton etc which are yet to be mechanised. The tentative targets for area and anticipated yields for important crops are given in Appendix - 1.

1.2. Agencies connected with and implementing agricultural production programmes consists of:

1. Government organizations engaged in agricultural production.

- (a) Agricultural Projects Committee.
- (b) Project farms and co-operatives assisted by administrations such as Greater Huesyib, Khaila etc.
- (c) Farms operated by the State Company for Agricultural production.
- (d) The State Organization for Agricultural Stations providing agricultural machinery hiring services.

2. Subsidiaries.

- 3. F&B units not belonging to co-operatives.

1.3. The above, from the point of selection and economical use of farm equipment present three farming situations:

- (a) Govt. Organizations with high investment capacity, better field lay out, management skill and facilities for repair and maintenance where investments on relatively more sophisticated and expensive equipment is required and justified.
- (b) Co-operatives with investment resources and relatively less technical skill and facilities.
- (c) Individual farm units, which have to depend on hired machinery services, self owned and operated equipment which are easy to be maintained and operated.

Unirrigated areas present another situation as far as equipment requirements and selection are concerned.

3.4. Taking into account the above ~~SECTION~~, a brief analysis of equipment that are required to be introduced is given in section IV. The discussions and identification of types of equipment are limited to those that offer scope for a progressive production build up or those that are essential to be introduced for meeting the needs of agriculture. The equipment are categorised according to the following major agricultural operations.

1. Land development and drainage.
2. Seed bed preparation.
3. Planting.
4. Intercultivation operations.
5. Harvesting and threshing.
6. Post harvest handling.
7. Irrigation, plant protection and special crop production operations.

IV. ~~REQUIREMENTS FOR EQUIPMENT~~

Land Development

4.1. Major operation included land levelling. Doser tractors, motorised and towed scrapers, motor graders and other heavy equipment are extensively used by the Govt. projects, and the State Organisation for Excavation and Agricultural stations. The requirements of these machines are met out of imports. To speed up land development, heavy machines presently used should be complemented and supplemented by the use of wheeled tractors. Use of wheeled tractors during off-seasons would increase their annual hours of usage. It will also reduce cost of operation of lighter finishing jobs for which use of larger machines would be expensive.

The equipment to be introduced for use with wheeled tractors include:

(1) Motor Tractor

Power take off driven 3 to 5 cubic motor capacity, suitable for 60 to 80 hp wheeled tractors. (For use on Agricultural projects, Co-operatives, machinery hiring stations and by contractors.)

(2) **Leveling...**

An indispensable implement to be used in irrigated farming after levelling and for final seed bed preparation. At present use of land planes are limited to Govt. projects. The implement has to be popularised because improper grades and levels of irrigated fields cause water logging and inefficient use of water. The introduction of this implement in Iraq in view of the problems of salinity should have a high priority. Because of its fabricated construction, it can be manufactured by the SMI.

- (3) **Tractor Scarifier**. Capacity 2.5 cubic meter with leveller attachment.
(An implement which with attachments can be used either as a scraper or leveller, essential to be used by mechanised farms and co-operatives in the irrigated areas.)

(4) **Subsoiler**. Blade leveller.

In the absence of land planes and scrapers farmers in the irrigated areas are presently using locally made levellers which are poor in design. On the average, 80 percent of the tractor owners in the irrigated areas would like to possess levellers

4.2. **Drainage.**

4.2.1. Drainage forms an integral part of an irrigation system in the canal irrigated central and southern regions of Iraq which have problems of salinity. Draglines, hydraulic excavators and other heavy machines are used by Govt. organisations for construction of irrigation channels and field and collector drains with depths ranging from 2 to 3 meters. In most of the areas, blocking of drains by infestation of wild cane or reeds, earth filling etc. present a problem. Often majority of the drains as well as silted irrigation channels have to be cleared once a year. Inadequacy of

machines and techniques for reducing periodical maintenance result in poor functioning of drains and gradual increase in soil salinity.

4.2.2. The magnitude of the work becomes obvious from the fact that every one million hectares (4million dunams) of irrigated land would have 50,000 to 60,000 km. long field and collector drains. Even if periodical maintenance is done once in two years at a daily out put of 250 meter per day of 8 hrs. by hydraulic excavators (the average obtained in GMPA) 333 excavators operating for about 300 days a year at an operating cost of 1.6 million I.D (operating cost taken at Govt. hiring rate of I.D. 16 per day) will be required for every one million hectares.

4.2.3. Considering that irrigation and drainage facilities will ultimately be developed in about 8 million dunams of the usual irrigated areas, and the heavier machines could be more economically used for opening new drains and for heavy maintenance jobs, need exists for trying alternative equipment combinations involving Iraq made wheeled tractors.

The equipment to be introduced:

- (1) ~~Back mounted loader digger/ditcher for 10 to 50 hp tractors.~~

After initial trials, the equipment being mostly of fabricated design, could be adapted and taken up for local production. (The equipment with other attachments can also be used for a wide range of loading operations on farms as well as for construction jobs.)

4.3. ~~Seed bed preparation.~~

4.3.1. A wide range of tractor implements are used for seed bed preparation. Tillage implements that have become popular in Iraq are mould board ploughs and cultivators. Three and four furrow mould board ploughs as well as nine to eleven tined

spring cultivators are at present manufactured in the USSR. It may however be noted that mould board ploughs have become popular in Iraq because these ploughs happened to be imported into Iraq in the past along with the tractors by the different tractor importers and there is little experience or research on alternative equipment combinations best suited to arid conditions.

4.3.2. Soil inversion with mould board ploughs under most of the conditions in Iraq is not essential. Use of these ploughs under irrigated soil conditions, disturbs the level of the soil. Soil loosening with heavy duty cultivators and harrows to a depth of 10-15 cm. for cereal crops and about 20 cm. for deep rooted crops such as cotton, is considered adequate. Further, at present ploughing is normally done during summer months after harvesting of wheat and barley when the soil is hard. Ploughing with mould board plough without pre-irrigation leaves the field cloddy, and several secondary operations followed by a final levelling becomes necessary for obtaining a good level seed bed. But use of subsoiling ploughs after harvesting of the winter crops followed by harrowing by a disc harrow or use of a cultivator would provide a good seed bed with minimum disturbance to level.

4.3.3. In the rain-fed areas, ploughing with M.B. ploughs exposes the soil to wind and water erosion, where as a deep tillage with minimum disturbance to the stubble and top soil, leaving the plant residue on the soil surface to act as a mulch is essential. This is more important because, in the 11 million deems of rain-fed areas especially those with undulating terrain in the Northern part of Iraq representing half of the country's cultivated area, virtually no soil and water conservation measures; contour farming, construction of broad base terraces on slopes, strip cropping etc. are practised. Therefore, excessive exposure of soil would gradually render the soil unproductive due to erosion. In those areas, mulcher or subsoiling ploughs, or heavy duty cultivators which will loosen the soil to depths of 20 to 30 cm. followed by a light harrowing in the trough

fields or cultivation with flat or duck foot shovels in the less trashy fields along the contour would provide a good seed bed and also conserve soil and moisture.

4.3.4. Few firms in Seoul, for meeting the demand, are manufacturing any heavy duty harrows based on obsolete designs. Their annual production range from 70 to 150 numbers. For meeting the farming conditions described above, implements to be introduced include:

(1) Mulcher or subsoiling plough

Initially to meet the requirements of agricultural machinery hiring stations, co-operatives and owner operators. (A 5 bottom mulcher plough imported and tested under farming conditions in the North was found suitable.)

(2) Disc plough/heavy duty cultivator -with 9 to 13 heavy duty shares 3 point hitch mounted.
(These can be developed and manufactured in the USSR.)

(3) Heavy duty trailed off-set disc harrow

Besides light duty mounted tandem disc harrows in the manufacturing range of USSR, for use under heavy soil conditions and for rain-fed areas a heavier harrow is required. Discs, disc spools etc. which are being manufactured in the USSR would enable interchangeability of components between the different models of disc harrows that may be developed and introduced.

4.4. Farming.

Seed and barley valued in about 10 million Rupees (except in case of the Govt. Projects using good seed and fertilizer drills) are sown by the inefficient method of hand broadcasting and the seeds are mixed with the soil by the use of cultivators or harrows. This results in poor germination, uneven stand and reduced yield of crops. About 20 to 25 per cent higher seed rate is required to compensate for loss of seeds and poor germination.

4.4.1. Intensive farming requires accurate placement of seeds at proper soil depths with uniform spacing between plants, and application of fertilizer in the root zone of the plants.

4.4.2. The Ichangnaga factory had imported and assembled about 100 trailed type good seed fertilizer drills. These are useful for well prepared seed beds. While preparation of a good seed bed is what has to be achieved, the practice in the unirrigated areas and in some of the irrigated areas is to broadcast the seed on a partially tilled seedbed and covering same by harrowing. Thus demand exists for seed drills of rugged construction that would enable planting under adverse soil conditions. Private firms in Nagal engaged in the production of one way trailed disc harrows are manufacturing good distributors mounted on harrows. The numbers sold by them is about 500 and their

annual production is about 30 million, but these designs are crude. The good distributors require only hand broadcasting. Good therefore exists for introducing seed drills that are suitable for an existing farming situation and hard soil conditions which could also meet the requirements when the farming practices are improved.

4.4.4. In the canal irrigated areas, the present practice of planting in dry soil followed by irrigation for germination, though is popular, causes formation of soil crust and suppression of germinated seeds. The problem arising out of this is more pronounced in heavier soils and will increase gradually due to the high deposit rate of silt carried by the irrigation water. Further, the crop has to compete with weeds germinating during the same period and suppression of crop by weeds is a problem.

4.4.5. While irrigation coinciding with the germination period would soften the crust, it is necessary that the good drills to be introduced are suitable for a form of furrow planting a dry farming technique, which can be used in irrigated areas as well. The advantages would be a more uniform germination of crop unaffected by crust formation and water logging, and reduction of interval between planting and the first irrigation. This would also delay germination of weeds and promote better root development. In this method pre-sowing irrigation has to be followed by a shallow tillage with cultivators fitted with duck foot shovels or disc harrows which will provide a reasonably well prepared, compact soil mulch conserving enough moisture for germination of seed. The planting done with seed drills with knife or narrow reversible shovel type furrow opener which would plant the seed in the moist soil with only 3 to 5 cm. of loose soil to cover the seed would have better performance.

4.4.6. Narrow irrigation headrows and short strips would make mounted drills more easy to be handled as compared to the

trailed seed drills, for the efficient use of which, well laid out fields are required.

4.4.7. For the cultivators and harrows at present being manufactured in the SCPI, development and introduction of a seeding and fertilizing attachment common to both the implements would improve their utility and enable meeting the requirements of seed drills. In the light of the above discussions, introduction and popularisation of the following seeding equipment for rain fed and irrigated areas are necessary.

(1) Trailed 3.00 h one way disc harrow with seeding and fertilizing attachment.
(for use in the rain fed areas by Ag. machinery hiring stations, co-operatives and by farmer contractors.) This offers scope for development and production in the SCPI and can be used both for harrowing and planting.

(2) Seeding and fertilizing attachment mounted on 9- disc one way mounted disc harrow.
For use in the rain fed areas as well as irrigated areas as a multi-purpose implement for tillage and seeding.

(3) Seeding attachment mounted on 11 to 13 tined spring cultivators.
For use with 50 to 70 hp. tractors for seed bed preparation and planting in heavy soils in rain-fed and irrigated areas. Cultivators and disc harrows are under production in the SCPI and a seeding attachment can be developed and attached to them.

4.4.8. Other major crops for which planters will be required include broad beans, lentils, linseed, sugarbeet, coconut, corn, peanut, green gram, sorghum, vegetable crops, and potatoes.

Except for potatoes, the seeds of these crops come under two groups.

- (a) Large and medium sized seeds.
- (b) Small seeds.

Planters that are suitable for large and medium sized seeds such as corn, shelled peanut, delinted cotton etc. which could be used for precision planting of vegetables and other small seeds, sugar beet, etc. are in use in other countries. These are to be introduced and popularized in Iraq as a step towards more intensive farming.

4.4.9. The target set for the year 1973-74 for different crops in Iraq is given in Annex II. The implements to be introduced initially shall be limited to a multi crop planters.

- (4) One row multi-crop, 1000 kg capacity with
planter with seed plates for large, medium
and small seeds including beet, with fertilizer
herbicide and other attachments.

4.4.10. Potato is a new crop in Iraq area under which is proposed to be increased to about 17,500 decares in 73-74 as against about 8,000 decares in 72-73. While more sophisticated automatic planters will be more economical for use on the Govt. farms, nearly 12, 000 decares will be planted on the farms of co-operatives and on individual farm units. For planting, ridging is an indispensable operation which at present is carried out mostly by tractor operated ridgers. A planting and fertilizing attachment for ridger would ensure faster planting and simultaneous side placement of fertilizers. With programmes to construct cold storages for seed potatoes and other promotional measures being taken by the Govt., coupled with a high profitability from the crop, the area under it is bound to increase substantially. Equipment to be introduced and popularized include:

- (5) Automatic 2/4 potato planter with fertilizing
attachment. (For use of Govt. projects and
co-operative farms.)
- (6) One row semi automatic potato planter with
fertilizing attachment mounted on ridger.

Light duty ridges have already been developed in the USSR and development and introduction of a planting and fertilizer attachment for it, would improve its sale potential.

4.4.11 Planting of vegetable crops is done mostly by manual labour on individual farm units. Vegetable farming is highly profitable and labour shortage and lack of suitable implements are some of the factors restricting extension of the area. Low cost simple manually operated planters with attachments for weeding, fertilizing, furrow closing and curbing up would improve labour productivity.

In 1971 525,500 hectares were under different vegetable crops and shovel is the most commonly used tool for all soil working operations. Implement to be introduced:

- (7) Hand steel hand planter, with ridging, fertilizing and weeding attachments suitable for ridge row crops and for a row spacing of 30 cm.

4.5. Intercultivation operations

4.5.1 For increasing yields, intercultivation of row crops to suppress weed growth, reshaping of ridges and furrows for more efficient irrigation, band placement of fertilizers as close to the root zone of the plants, and earthing up for crops such as potato, groundnut and other ridge sown crops are essential. Except on few of the mechanized farms, intercultivation with cultivators is not practised. The present method of applying fertilizer on the soil surface during the growth period of plants and their partial incorporation into the soil by spades (practised only on small farms) causes loss of fertilizer by leaching and reduces efficiency of plant utilization by about 20 to 30 percent.

4.5.2. The accessories for cultivator under production in the GSI include intercultivation attachment but does not include a fertilizer attachment. This has to be developed and introduced. The immediate need is popularization of intercultivators with fertilizer attachment for use with GSI made tractors for corn, cotton, potatoes, peanut, grain sorghum and some of the widerrow spaced vegetable crops. Implement to be introduced:

- (1) Mounted four-row fertilizer cultivator with ridging bodies and weeding shovels for row widths up to 90 cm.
(Model HSI-4.8pm Four row fertilizer cultivator imported by the GSI and already tested in Iraq was found to be suitable)

4.6. Harvesting and threshing

About 80 percent of the total cultivated area in Iraq is under wheat and barley. These crops are grown under rainfed conditions in the northern areas where the fields are very large where large combine harvesters would be the best choice.

In the irrigated areas, lay out does not enable efficient use of larger machines. Combines which can be more easily handled and less expensive which could be owned and operated by small and medium farm units by attaching to tractors are also required to be introduced.

4.6.2. Experience during the last season shows that in Mool area in the absence of grain cleaners, combines were used as grain cleaners, and yet, due to inadequacy of machines, the work extended up to end of December and damage to grain stored in the open awaiting cleaning and storing was heavy. With the extension of area under wheat and other cereal crops, for timely harvesting about 3,000 combine harvesters will be required.

4.6.3. Tractor operated combines, major assemblies of which could also be used for production of stationary threshers and seed cleaners, are easy to be manufactured in small quantities. Further, development of facilities for production of its parts such as knives, guard sections, pulleys etc. would enable meeting spare parts requirements of self propelled combines already imported into the country. The implement to be introduced

- (1) Tractor side mounted combine harvester suitable for 60 to 80 hp. wheeled tractors which can be easily handled in small fields. (These are extensively used in some of the European countries.) Initial efforts have to be directed towards extensive trial of designs already developed with the objective of adapting and modifying the design, and development of stationary threshers and seed cleaners using interchangeable assemblies.

4.6.4. There are large number of farm units using manual methods of harvesting and threshing. For such farming situations portable, low cost, power threshers which could be owned and operated by the farmers either individually or jointly and could also be used for crops such as gram, and other legumes threshing of which is yet to be mechanized would fill the mechanization gap. The implement to be introduced:

- (2) Portable multi-crop thresher with bagging attachment.

4.6.5. Hay handling: The estimated population of 2500 combine harvesters presently used in Iraq either leave the straw in the field in heaps, or in a windrow. This causes extra work load in freighting the land from the straw for subsequent agricultural operations. In view of the high feed value of straw, use of hay rakes, and pick up balers are essential to be used in combination with the combines for easy handling, transporting and storage. Equipment to be introduced:

(1) 1400 Salween hay rake

(2) Tractor P.S.O. driven pick up hay baler.

4.6.6. Other harvesting and threshing equipment having high priority are special purpose machines such as maize sheller, peanut threshers, potato diggers etc.

4.7. Post harvest handling

4.7.1. A wide range of general and special purpose equipment are used for handling and transport, seed grading and processing. These would form component part of an equipment system and these are not discussed in this report. Farm trailers single and double axle types, which with special bodies can also be used for transporting grains are under production in the USSR. Besides this, equipment to be introduced is:

(1) Portable elevator conveyor- essential to be used on agricultural projects, dairy farms & co-operatives which would enable loading, un-loading and stacking seed and fertilizer, farm produce such as potatoes, corn cobs, hay bales etc.

4.8. Irrigation, plant protection and animal crop protection operations.

Irrigation

4.8.1. Engine and electric motor driven pumps are extensively used in Iraq and their population is increasing at a fast rate. (Ref. Fig. I.) In 1970-71, their population was 14,135 numbers with an average horse power of about 25. The following table shows that about 20 percent of the total cultivated arable land is irrigatable by pumps and about 14.5 million dunams is irrigatable either from canals or by pumping.

Yet the total area cultivated every year in Iraq including rewatered areas is only about 12 million dunams. Thus the available irrigation resources offer considerable scope for increasing the cropped area and cropping intensity.

Classification of Exploited Arable Land based on
Type of Irrigation^{1/2}

Table 1.

Type of Irrigation	Area (1000 Dunams)	Percent of Total exploited arable land
Rain Fed (Not irrigated)	15,445	51.23
Artificial methods (by canal)	8,663	28.74
Irrigated by Pumps	5,795	19.23
Irrigated by water wheels	201	0.67
Irrigated by Persian wheels	28	0.09
Other methods	13	0.04
Total	30,145	100.00

4.6.2 Commonly used pumps are centrifugal and turbine pumps which are used for both low and high lifts. A 152 cm x 150mm centrifugal pump has already been developed in the SRI and is included in the production programme of the factory.

4.6.3 Irrigation by pumping from Tigris and Euphrates rivers and its tributaries ordinarily involve delivery heads of more than 30

^{1/2} Based on reference cited at E.No. 5

However, in the canal irrigated areas, where pumping is required, lift involved in most cases is 1 to 2 m for which low head, high capacity, single stage propeller pumps are most suitable as against presently used centrifugal pumps which are designed for medium and high delivery heads. Propeller pumps have impellers mounted on vertical shafts and these can be driven by tractor belt pulley, stationary engines or electric motors. Suction pipes of 45 to 60 cm diameter and rectangular or circular delivery chambers are of fabricated design. The pump except for the impeller (Requiring foundry) can be manufactured by using general purpose machines.

Other advantages include:

- (1) Initial low cost as compared to other types of the same capacity for low delivery heads.
- (2) Higher discharge for the power input.
- (3) Easy for installation, maintenance and repair.

4.3.4. The silt load in canal water from rivers is high (average 1%) and this accelerates wear of impellers of pumps and thereby reduces efficiency. Propeller pumps under such conditions may have a relatively lower maintenance cost which would be an added advantage.

4.3.5. For fully utilizing canal water resources for irrigating areas where the topography of land would not permit irrigation by gravity, besides low lift propeller pumps discussed above, portable high capacity irrigation pumps which could be mounted to and driven by tractors or separate engines are also needed.

4.3.6. Equipment needed.

- (1) Low lift high capacity single stage propeller pumps.
- (2) High capacity portable tractor driven centrifugal pumps.

Initial action should be in obtaining one or two samples each for studies and observations in consultation with the irrigation department and simultaneous demand assessment and development of local designs. Exports to be organized shall be limited to quantities essential for meeting firm demands and those essential for generating a demand for local production that may be organized.

4.10. Miscellaneous Equipment.

4.10.1. Fodder choppers and food grinding mills.

In 1970 animal population was about 18 million of which animals excluding sheep was 2.76 million. 1966 animal and animal products constituted about 40% of the total value of agricultural products. With more intensive farming practices being adopted, feeding of animals by grazing especially of cattle will be replaced and supplemented by stall feeding. Alfalfa and berseem for fodder are grown in about 0.15 million hectares and crops such as maize and sorghum used for both grain and fodderage also grown in large areas. Labour saving manually operated shaft cutters that could be used by individual farm units and tractor operated mower choppers which would harvest and simultaneously chop and load the fodder into trailers for easy handling to be used by co-operatives, dairy farms etc. are required and are to be introduced. There is a demand for grinders for both animal and poultry feed. A firm in Nepal has already taken up production of food grinders, and has marketed 10 numbers of electrically driven grinding mills of 0.5 ton capacity per hour.

Equipment required:

1. Fodder cutters - manually operated - fly wheel type
2. Mower chopper - tractor driven.
3. Grinding mills stationary - 0.5 to 1 ton capacity per hour.

4.10.2. Corn shellers.

The preliminary targets for 73-74 envisage production of 40,000 tons of corn from about 80,000 hectares. Buying centres are being established by the Govt. At present shelling is done by combine harvesters with corn attachments. Waiting period for shelling extends 2 to 4 months after harvest season and damage by high atmospheric humidity is high. Individual farm units are keen to possess low cost shelling machines and co-operatives are eager to possess high capacity machines which can cater to the needs of a large number of farmers.

Equipment to be introduced:

4. Stationary hand driven grain shellers adaptable for electric motor drive.
5. Tractor operated grain shellers - capacity 3 to 5 tons/hour.

A wide range of other equipment are also required for the different Agricultural production programs, but their requirements are not included in this report. Broad specifications of equipment included in section IV are given in Appendix-2.

V. IMPORTS AND DISTRIBUTION OF IMPLEMENTS

5.1. Introduction of equipment. Prior to the establishment of the State Machinery Imports Company (SMIC) in Baghdad which took over all imports of agricultural machines and implements in 1970-71, imports were made by the dealers of foreign manufacturers. For diversifying sales, these dealers imported samples for demonstrations and sale, assisted the buyer in the selection of equipment and provided after sale services. In this process they introduced such equipment as disc seed drills, rotavators, blade levellers, seed cleaners, etc. The experience gained in the sale and servicing of these products helped them to assess the suitability of implements for local conditions, demand trend and also for organizing production. At present, Iskandariya made implements are sold by SMIC through dealers appointed by them. A survey on the performance of dealers in Meirga carried out by the authors shows that there is a lack of sales effort, after sale service facilities and supervision of dealer performance. Sale of implements such as cultivators, seed drills, cotton planters etc. is low and there are large unsold stocks. Therefore, it is necessary for the Iskandariya factory to organize imports and take up direct sales by reorganizing the existing sales net work and thus be actively engaged in sales and sales promotion. It may have its own field staff to supervise and assist dealers in sales, demonstration, servicing and parts supply. (These aspects will be discussed in a separate report).

5.2. The items identified as offering scope for introduction in section IV are few considering the vast needs of the agricultural sector. It is not envisaged that economical production of all these items can be or should be organized in the SMIC. Some of them are intended for sale for developing a market and for assessing factors requiring special attention before a product is considered for adaptation/modification or manufacture on a future date.

5.3. Production.

Existing production methods are to be changed. Expensive jigs, dies and fixtures are now being used for production of new implements even before comprehensive tests and trials are carried out and customer acceptance is fully established. Present experience shows that changes in design of implements

become necessary to improve performance and to make the product competitive. These involve changes or modifications to the jigs, dies and fixtures which have already been made. Considerable time and man-hours are required for effecting the changes, these resulting in additional cost of manufacture. Further, the present method of production of almost all components and assemblies of implements in the factory even when the quantities involved are small by using expensive jigs and fixtures increases the cost of the end product. The number of jigs, tools, dies etc, designed and manufactured in the SSI is large. The expenditure involved is uneconomical for a initial low volume production and when there is no certainty that these will be used for many years. Table-1 shows the size of effort that has gone into the design and manufacture of these.

Table 1

Nos. Machines and tools designed and manufactured in the SSI
1971-72 and 1972-73

Item	Design		Production	
	1971	1972	1971	1972
Stamps and dies	224	963	161	338
Jigs and fixtures	221	486	193	480
Cutting and measuring tools	72	475	388	11713
Pattern units	-	-	45	109

The total cost of the jigs and fixtures manufactured in 1972-73 is ID.0.754 million. Alternative sources of supply of components that are expensive to be made in the factory have to be explored and developed and this should be coupled with adoption of a manufacturing technique more economical for low volume initial production.

5.4. In a situation for diversification of production, SSI may concentrate on the production of the implements for which a large demand has already been established. For supply of some of the components of these implements, and also implements which are to be manufactured in small quantities for trials, and those of simple design included in this report, it is necessary to develop sub-contractors out of the existing manufacturers etc. in the country, the SSI assisting them:

- (1) Through supply of imported source materials and components.
- (2) Supply of designs of components, assemblies or complete equipment.
- (3) Meeting requirements of production machines.

Quality control and standardisation of components, assembly of implements by using SSSI made and contractor supplied parts, testing of finished products and their marketing should thus also form part of the manufacturing activities of the SSSI. Where the volume is small, the SSSI may even supply to its contractors factory made parts involving use of special production facilities, the finished product to be sold by the SSSI under its trade mark and name.

5.5. The advantages of the above would be faster diversification of manufacture into new product lines, development and generation of demand for them to make ultimate large scale production of proven equipment by the SSSI more economical. Equally important is the contribution of SSSI in the general development of the mechanical industries in the country. Most of the leading manufacturers of the world are using the above production method. Adoption of this method by the SSSI is necessary for a more rapid utilization of its surplus capacity and for increasing its sales turnover.

5.6. In view of the programme for manufacture of lorries, tractors etc. in the Iskandariya factory, as a further step for development of a sub-contractor system, auxiliary industries may also be developed. These industries may even handle some of the production jobs on a piece rate basis.

5.7. Assistance to the auxiliary industries, besides those indicated in para 5.4 may include supply of sheds on rental basis and assistance in meeting requirements for finance for working capital and investments on workshop machines on liberal terms of credit.

5.8. A training school for machinemen, fitters, electricians and other technical trades has been established in Iskandariya for offering courses of 3 years duration. The first batch has been admitted this year. Graduates of this and similar schools, and manufacturers in the small scale sector who have already gained experience in this line, to whom technical and management assistance is provided by the staff of the training center and the SSSI could form core of a pilot industrial estate for auxiliary industries for Iskandariya Complex.

3.9. The production cost of components of implements already included in the manufacturing programme of SMI, production facilities available with other Govt. industrial undertakings, and private manufacturers require a detailed study. Similarly components of tractors, lorries etc. offering scope for economical production through ancillary industries, promotion and development of these industries through establishment of industrial estates, obtaining of proprietary items and other components from the 'international market at competitive prices require study by specialists. Obtaining assistance from SMI for the above and for the development of a programme for diversification of production would meet a felt need.

3.10. If quick results are to accrue with long term benefits to Iraq for meeting the requirements of both industrial and agricultural sectors, SMI assistance should include establishment of a National Farm Machinery Institute by utilizing the existing facilities in Iskandariya and the Greater Musayib Project.

VI. ~~REQUIREMENTS AND PROPOSED IMPORTS~~

Class of Imports.

6.1. The implements listed for a initial programme of imports are classified under the following three groups.

Group A. Items for which adequate demand exists and offering scope for adaptation, development and production. These may be further categorised as:

- (1) Makes and models of implements that can be selected and imported from well established manufacturers after scrutinising detailed specifications and technical literature.
- (2) Samples to be obtained and examined and field tests carried out for selection of design.

Group B. Items necessary for the agricultural programmes and demand is expected to develop if demonstrated and popularised. These at present have a lower priority for development and production, but a programme for tests and demonstrations are to be started immediately.

Group C. Items necessary for meeting the agricultural needs, but not economical for production.

6.2 Table 4 gives classification of equipment as outlined in para.6.1 and quantities recommended for initial imports. The quantities suggested considering the immediate agricultural needs are small, but are adequate to create an awareness on their usefulness and to select the type of designs that may be taken up for development and popularisation.

6.3 The requirements of different types of agricultural equipment by the Ministry of Agriculture and Agrarian Reform are large. At present the various organisations are meeting their requirements by importing different makes and models of ~~the same~~ ^{type of} equipment. This ultimately creates problems of spare parts and training of personnel. To limit the types and makes to a selected few, the BSRI should urgently convene a meeting of representatives of the Ministry of Agriculture and Agrarian Reform and the different Projects and organisations to assess their urgent requirements and based on the same

GROUP - 1
APPENDIX TO THE REPORT
 (refer foot note)

S. No.	Name of Implement & approximate price in local Rupees	How to be imported & Ref. of Para in report & S. No. in Appendix	Estimated Annual Demand build-up in 3 to 5 yrs	REMARKS
(1)	(2)		(4)	(5)

GROUP - 1-1

Items that are to be included in the list of equipment to be imported.

1.	Land Plow (200-300)	20 - 40 4-1 (2-2)	300 to 400	
2.	Multi purpose Blade Driveller (80-140)	60 - 80 4-1 (2-4)	500 to 1000	
3.	Heavy duty trailed offset disc harrow (800-1100)	40 - 60 4-3a4 (2-3)	400 to 500	Disc harrow planned for production.
4.	Trailed one way disc harrow with seeding & fertilizing attachment (600 - 800)	30 - 30 4-4a7 (2-1)	100 to 200	* Seeding attachment only
5.	Seeding and fertilizing attachment on spring cultivator (120 - 160)	30 - 30 4-4a7 (2-4)	500 to 1000	Cultivators are under production in the USSR
6.	Tractor side mounted combine harvester (1000 - 1200)	30 - 30 4-6 (2-1)	400 to 700*	*to include mud clearance & thresher conversions.
7.	Portable elevator conveyor (350 - 450)	15 - 20 4-3a5 (2-1)	50 to 70	
8.	Ripper cutter manually operated (18 - 25)	30 - 40 4-9 (2-1)	1000 to 2000	
9.	Stationary hand driven ridge sheller (15 - 20)	30 - 30 4-9a3 (2-1)	300 to 700	See item 15

GROUP - 1-2

Equipment to be covered in tests and demonstrations to be carried out.

10.	Chisel plough / Heavy duty cultivator (100 - 130)	30 - 60 4-3a4 (2-2)	300 to 700	
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(1)	(2)	(3)	(4)	(5)
11.	Single wheel hand weeder and attachment (8-17)	20 - 30 4.4.1 (2-7)	2000 to 3000	
12.	Portable multi-row thresher (200-250)	20 - 30 4.4.2 (2-3)	300 to 500	
13.	Tractor rear-mounted P.T.O. driven pump (150 - 170)	20 - 30 4.4.1 (2-1)	100 to 150	
14.	Grinding mill (150 - 200)	15 - 20 4.4.1 (2-3)	20 to 50	
15.	Four operated maize sheller (120-150)	20 - 30 4.4.2 (2-3)	20 to 50	
16.	<u>GROUP - B</u> <u>Supplies to be included for</u> <u>this demonstration & trials</u>			
1.	Elevator conveyor (700 - 1000)	15 4.1 (2-1)	30 to 50	
2.	Loader digger ditcher (1500 - 1700)	20 4.4.1 (2-3)	400 to 500	
3.	Grading and fertilizing attachment fitted to one row disc harrow (200-400)	150 4.4.7 (2-2)		* Also harrows are in the production range of S.M.E. 300 to 500 grading attach- ments included against item 5, in group A.
4.	Four row multirow tool bar mounted unit planter and plates for all types of seeds. (700-1000)	10 4.4.2 (2-2)	150 to 250	
5.	Two row semi-automatic, mounted potato planter with fertilizing attachment (200-300).	10 - 15 4.4.10 (2-2)	200 to 400 ferti- lizing at- tachment; 30-50 planting at- tachment	Planters are in the man- ufacturing programme of S.C.M.I.
6.	Low lift high capacity propeller pump (300-400)	5 4.7.4 (2-1)	200 to 300	
7.	High capacity mounted tractor P.T.O. driven centrifugal pump (200 - 300)	5 4.7.4 (2-1)	150 to 250	

(1)	(2)	(3)	(4)
ANNEX FOR AGRICULTURE IN THE SUDAN			
1. Tractor or subsoiling plough (100-400)	3 4,500 (2-4)	Model 520 100 from USSR tested in Iraq may be imported, for popularizing benefits of subsoil tilling and for developing a conventional till for ploughs in production in the SUDAN.	
2. Mounted Green Fertilizer applicator (125)	30 4,500 (2-4)	Model 520-2,0 from USSR tested may be imported. It should be suitable for some 7000 ha.	
3. Side delivery roller (370 - 400)	20 4,500 (2-3)	For use by the Ag. projects and cooperatives.	
4. Tractor P.F.O. driven plough harrow (2000-3000)	20 4,500 (2-4)	For use by the Ag. projects and cooperatives.	
5. Rotary mower cum chopper (100 - 1000)	10 4,500 (2-3)	For animal husbandry projects and cooperatives in the irrigated areas.	

- Notes**
- Prices indicated only to serve as a general guide
 - Exact pricing (SUD) indicated in column 4 would depend upon the mechanization strategy (Refer paragraph 6.5 & 6.6)
 - Items to be imported are suggestive (Refer paragraph 6.3)

the specifications as well as quantities to be imported may be suitably modified.

6.4. Standardization of makes and models to be imported would enable the SMI to organise production of spare parts for imported implements, in the preparation of instruction manuals on operation and maintenance, training of operators and assist in the servicing of the equipment.

Demand Build-up.

6.5. For a particular type of implement, while there may be a large potential demand, annual build-up of demand and total demand over a specified period would depend upon several factors. These include:

- (1) Awareness of the users on the benefits of using new implements influenced by publicity and demonstrations.
- (2) Availability, Performance and functional suitability.
- (3) Existing farming practices and changes to be made to these to enable efficient use of equipment.
- (4) Investment capacity.
- (5) Facilities for servicing and supply of spare parts.
- (6) Alternative methods of carrying out the agricultural operations and the net gain to the user in financial and management terms.
- (7) Promotional measures taken up by the Govt. for popularising new equipment and agricultural mechanisation in general.

6.6. A strategy for agricultural mechanisation for Iraq is yet to be developed. While agricultural production plans in terms of area under different crops and average yields to be obtained are fixed, detailed studies are yet to be made with respect to:

- (a) The best suited equipment combinations or implements, the use of which should be promoted under the different farming situations indicated in para 3.3. or should
- (b) The degree of mechanisation that can be achieved in 5 to 7 years and technical, financial and organisational resources now available and are to be provided.

The above are essential for estimating demand build-up and production in the SMI.

6.7. A detailed analysis of demand and demand build-up is outside the scope of this paper and such an analysis should be taken up separately.

6.8. The initial production has to be low to evaluate factors that may restrict sales and for rectifying them. Low volume production including sufficient numbers of prototypes can be organized by the SSI¹ utilizing facilities in their production shop for non standard items which has adequate capacity in terms of machines and men or through a sub-contractor system (Ref Para 5.4)

6.9. Estimated demand build-up in about 3 years time after a product has been introduced and demonstrated is given in column 4 of Table 4. It is assumed that the SSI would establish an aggressive sales service net work which would participate and take an active role in the introduction and popularization of new equipment. Special programmes for promotion of mechanisation would increase the domestic demand substantially.

VII. ~~RECOMMENDATIONS~~

7.1. ~~Procurement of equipment.~~

- (a) To avoid loss of time, quotations may be invited on a world wide basis (A list of manufacturers whose specialities include implements listed in Table- 4, and appendix- 2 will be compiled before initiating procurement action.)
- (b) Some of the firms would be willing to make available samples for trials and offer a commission on their export prices based on quantities of first order and prospects of future supplies. While inviting quotations the different firms may be requested to furnish details of these.
- (c) After possible sources of supply and specifications of equipment best suited have been identified, literature on them and price details may be circulated to the Ministry of Agriculture and Agrarian Reform and the different projects under them. Their immediate demand and requirements of all types of agricultural equipment for 3 to 5 years may also be discussed

in a meeting as indicated in para- 6.). Quantities for initial imports may be modified to match the immediate needs. Information collected should also serve as a basis for assigning priorities for tests and trials, adaptation and production build-up.

- (d) The total value of equipment included in the different groups works out to about

Group- A-1 and A-2	I D - 0.17 million
Group- B.	I D - 0.06 million
Group- C.	I D - 0.09 million

Total	I D - 0.32 million

Since all the equipment will not be received at one time, and having located in advance prospective buyers, it is estimated that earmarking of about I.D. 0.05 million out of trading account of SEMI would meet the financial requirements for imports.

7.2. Distribution and Sale.

- (a) Sale of equipment to Govt. Projects may be made direct by the SEMI while sale to individual tractor owners may be made through dealers selected in the different regions who may be required to possess or sell at least one sample which could be used for demonstration purposes as well.
- (b) Pre and after sale services for implements at present is lacking. Assistance in the selection and efficient utilization of equipment, training of users, assured supply of spare parts and servicing assistance is a service to be rendered by the seller, the cost of which is normally and ought to be included in the selling price. The existing margins on implements may therefore be increased by about 7 percent to cover the expenses on account of these services. (There is a serious deficiency in after sale services)
- (c) For each equipment illustrated operation and maintenance manuals and spare parts catalogues received from the manufacturers should be supplemented by instruction manuals on use and maintenance in the Arabic language.

7.3. Requirements of staff and facilities.

7.3.1. The major elements of work involved includes:

- a. Inviting of quotations, their processing and placing of orders.
- b. Assembling of implements and modifications where the same are necessary.
- c. Demonstration and publicity.
- d. Tests, trials and user evaluation.
- e. Sale and after sale services.
- f. Organisation of production.

7.3.2. Staff. The commercial, production and technology divisions of the SSSI are handling jobs at a, b and f above and the staff available are adequate to handle the proposed initial and subsequent imports. The manpower capabilities of the factory would become obvious from the following table.

Table 51

Staff Strength of Industrial Factory.

Engineers	120
Technical Staff	148
Staff of office	205
Workers	2262
Apprentices	97
Labourers	30

total

2852

Experts

91⁶

⁶ From the various collaborating manufacturing organisations.

7.3.3 Staff either by re-allocation or by augmentation is required for demonstration, testing of implements, user survey and for servicing, as indicated below.

Demonstration:

The SSSI does not have a team for regular demonstration of agricultural equipment. The Testing-Development-Research Division organised a large demonstration of agricultural implements in November 1972, and based on this experience the management of the factory organised a series of demonstrations and meetings on mechanisation in the different governorates in Northern Iraq.

This gave very good results. Such programmes should form a regular feature for popularising equipment currently under production and new ones to be introduced in Iraq and for promoting export sales. Assistance in carrying out survey on performance, durability and related aspects may form functions of this team.

Staff to be provided shall be:

- Engineer 1
- Jr. Engineer/Technician 1
- Demonstrator 1

Facilities.

One publicity van with audio visual equipment and a truck.

7.3.4. Servicing.

Lack of supervision on the performance of dealers in the discharge of their servicing obligation is causing difficulties to users. SEMI should have field service Engineers who would periodically visit the different areas, supervise and guide the servicing work of dealers, investigate failures and poor performance of equipment. To Govt. projects which are bulk purchasers of SEMI equipment, service engineers may make periodical visits to attend to and assist in the servicing and repair work on a charge basis.

Staff and other facilities to be provided:

- Senior servicing Engineer 1
- Servicing team consisting of one Engineer two mechanics, and one helper with mobile servicing van one each for Central, Southern and Northern regions. } teams

7.3.5 Testing Development and User Survey.

Establishment of a Testing Development Research Division in the Iskandariya factory under a Chief Engineer as a major sectoral activity of the company is an important step taken by the management in improving the manufacturing and marketing capabilities of the factory through, tests,

development and research in agricultural machinery and implements. This division, within a short period of its setting up had taken up a sizeable programme of tests, design modifications etc. and evaluation of new products.

7.3.6. Requirements of staff and facilities of this division are discussed in the draft proposals Dtd. 18th Sept. '72 " Assistance to Iskandariya Industrial Complex." (Proposals for U.N. assistance to establish Testing Development and Research Division). It is necessary to provide the staff and other facilities recommended in the above proposals, with 50% augmentation of staff for testing and design adaptation.

VIII. REPORTING PROGRAMME AND ACTIVITIES

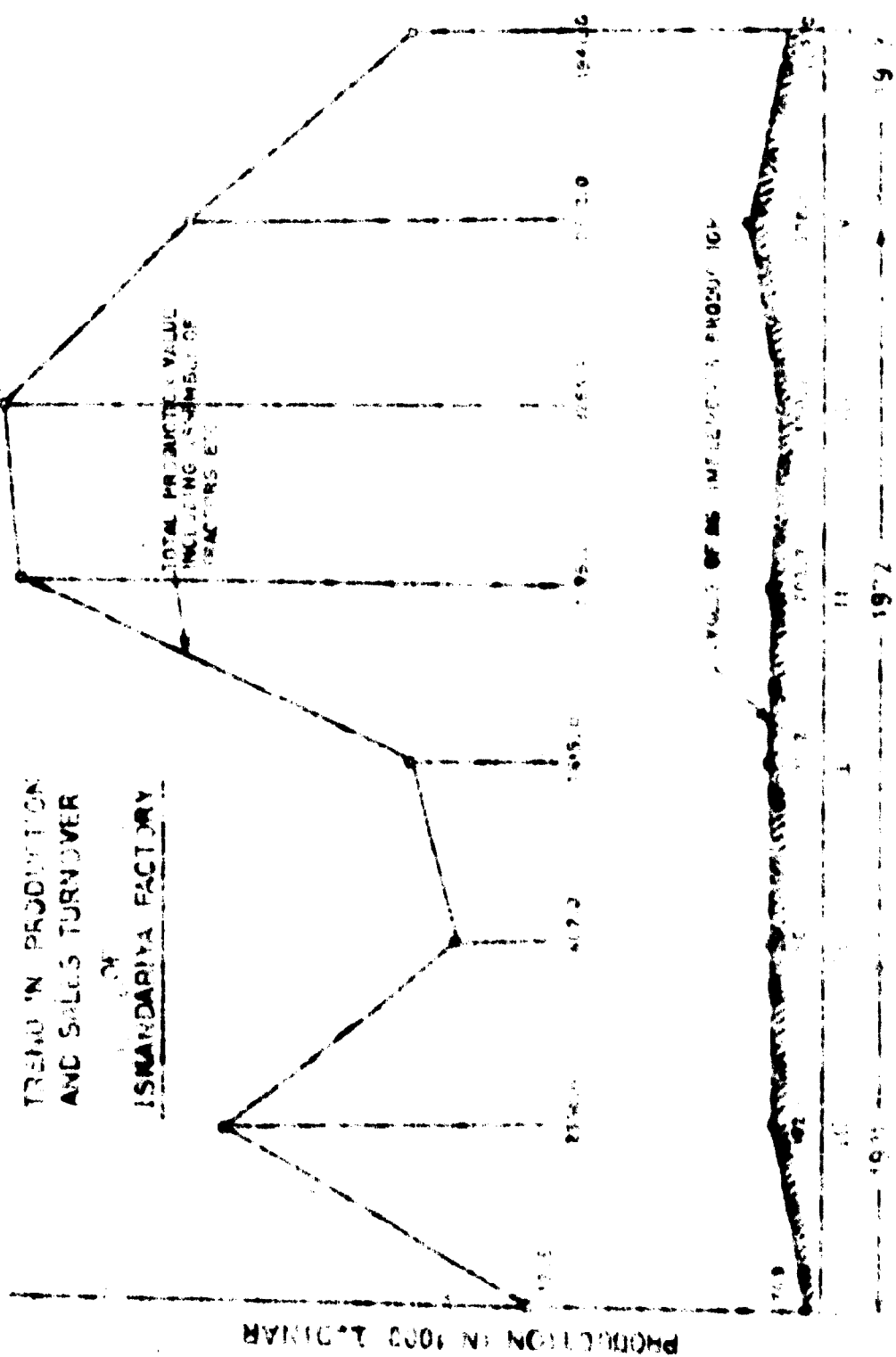
8.1. Declining Production of Iskandariya Factory.

The production and the total output of the factory including value of tractors and implements assembled is showing a declining trend as shown in figure 2. Also the actual production as against targets set was low as shown in table.5.

Table 6.

Targets set and achievement in production during the year 1972-73

Item	Unit	Target	Actual	Percent achievement
1. Ag. Implements Production	Nos	7,700	1,734	22
2. Bodies of trucks	Nos	520	294	56
3. Wooden products	Dinar	190,000	93,122	48
4. Castings	Ton	4,313	2,676	62
5. Non standard items	Nos	780	77	9
6. Assembly of Ag. equipment	Nos	1,900	1,654	87



100

8.1.1. Progress of production is reported by the SSI in terms of numbers and values of manufactured products. In terms of financial viability, in the absence of detailed studies on cost economics of production, as a rule of thumb, for a manufacturing activity, a ratio between capital investment and production turn over of 1:1 to 1:1.25, and for a partial manufacturing activity a ratio of 1:2 to 1:3 could be considered reasonable. Taking the above ratios as a guide, for estimating the production volume to be achieved by the SSI for an investment of I.D.15 million on buildings and machines, Figure 1 shows the progress to be achieved both for a manufacturing programme and a programme of partial manufacture and assembly. The declining trend warrants special measures and efforts to improve the utilization of surplus capacity.

8.2. Special Governmental assistance to Iskandariya Factory.

8.2.1. The SSI and the State Organization of Engineering Industries in the Ministry of Industry has taken up a number of steps to improve the utilization of surplus manufacturing capacity. But special Governmental assistance is required if the factory has to utilize quickly the surplus capacity and to enable it to effectively contribute to the country's industrial and agricultural development.

8.2.2. The situation obtaining in Iraq today is:

- (a) Studies on long term requirements of farm equipment by the agricultural sector and programmes to ensure that these demand assessments are realized by actual sales are lacking. Because of this, SSI is not able to plan realistically its programmes for development and production of agricultural equipment.
- (b) There is a lack or total absence of supporting programmes which would help the factory, and which in other countries under similar situations are generally sponsored and financed by the Government. These include
 - (1) Absence of a national farm machinery institute which would help the factory in testing, development, etc, and in making available research data on mechanisation problems, needs, and trends.

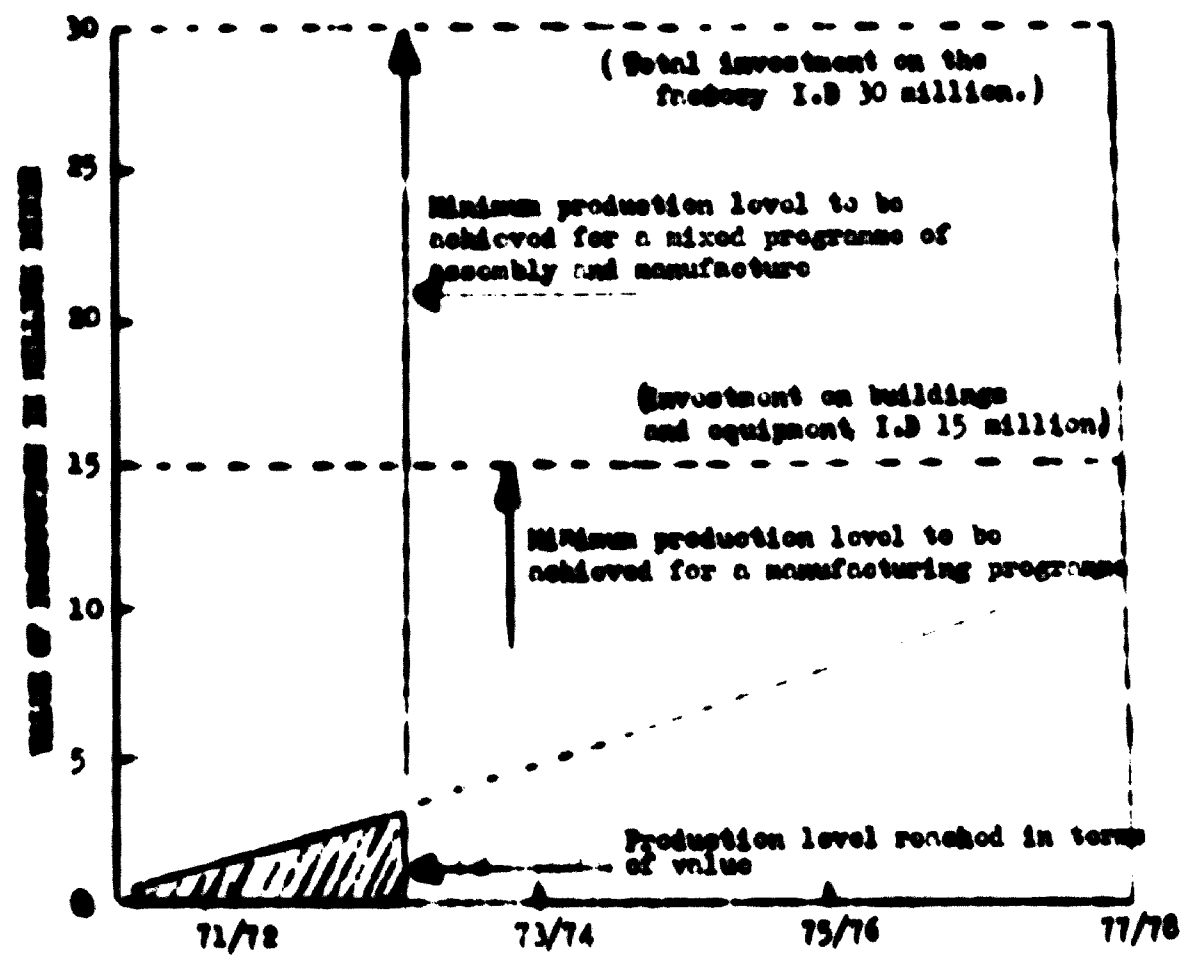
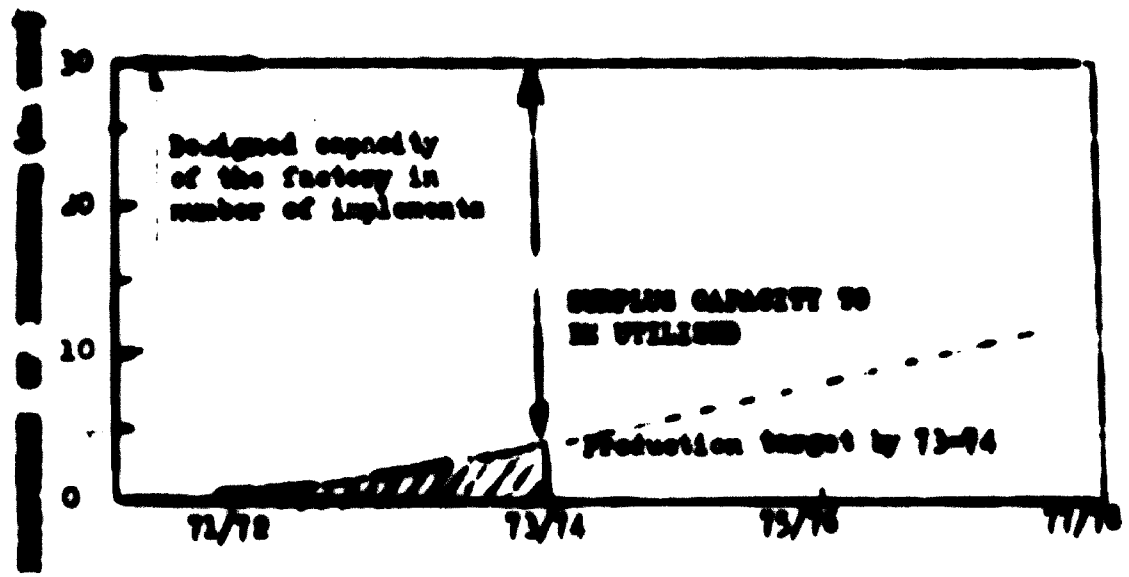


Fig. 3 TEND IN THE UTILIZATION OF MANUFACTURING CAPACITY OF IZHANSKIYA FACTORY

- (2) National programmes of demonstration and popularisation of new equipment and mechanised farming practices.
- (3) Training institutions on agricultural machinery selection and utilisation.

8.2.3. As a consequence of the above, even when the different programmes of agricultural development are being taken up, the demand build up, even for some of the most essential equipment is low. Typical examples are that about 50% of the 150 Seed cum fertilizer drills, and 50 cotton planters produced by the SSIK as early as 1971, still remain unsold. This has to be viewed against a background that 95 percent of cereal crops are still sown in Iraq by the unscientific and inefficient method of hand broadcast and cotton is a priority industrial crop. (Refer to attached areas and targets in Appendix-4)

8.2.4. Activities of promotional nature, if are to be handled by the SSIK, would result in additional expenditure which strictly from a commercial angle would be un-remunerative when demand build up and total annual demands for different types of equipment are low. In most of the countries where Govt. promotes agricultural production through agricultural mechanisation, special incentives are given. For example, in England, Diesel oil to farmers for use on tractors etc. is sold at a reduced price. The agricultural machinery industry, though well developed, design, development and testing facilities are provided by the National Institutes. In India, equipment that are to be popularised are taken up for development and demonstration by the Government and sale price was subsidised to the extent of 50 percent, the subsidy withdrawn in a phased manner.

8.2.5. In the light of the above, till such time a comprehensive programme for promotion of agricultural mechanisation of the country is developed, it is suggested that the extra cost of trial, development and popularisation of new equipment is borne by a special grant to the SSIK or the SSIK is allowed a developmental expenditure equal to 50 percent of the cost of new equipment sold by it during the first three years of introduction of the equipment.

8.3. Identification team of officers.

8.3.1. To identify makes and types of equipment offering scope for introduction, collaborative programmes of manufacture, to study manufacturing techniques used for economical low volume production, testing, development and other related programmes, a team of officers from the Iskandariya factory, State Organisation of Engineering Industries, Ministry of Agriculture and Agrarian Reform may visit countries such as UK, India and USSR. Since UNIDO is already assisting Iraq in the field of Agricultural Machinery, such a visit may be sponsored and arranged by the UNIDO.

8.4. Manufacturing feasibility studies and establishment of a special manufacturing unit. (UNEP/UNIDO assisted)

8.4.1. A quick study on the manufacturing feasibility of selected agricultural equipment which can be taken up for production in a phased manner within about a year would be an important step for diversification of production. Items falling in this category include manual and power operated plant protection equipment, tractor operated combine harvesters, turbine and propeller type irrigation pumps and heavy duty harrows and cultivators with seeding and fertilising attachments.

8.4.2. UNIDO assistance.

UNIDO is assisting a number of countries in the development of agricultural machinery industry and is actively engaged in promoting regional co-operation in the production, marketing and utilization aspects of agricultural machines (x) (See foot note). It is significant that the UNIDO-ECAS sponsored conference of Arab-States on manufacture of Lorries and Agricultural machines held in Baghdad in 1971 recommended that Iraq in view of its large manufacturing facilities for agricultural equipment established in Iskandariya may meet All-Arab requirements of the type of equipment manufactured in Iraq. Therefore a follow up action should

(x) Details of assistance rendered by UNIDO are given in document L.S-96 Dtd. 30th May 1972 "THE ROLE OF UNIDO IN PROMOTING AGRICULTURAL MACHINERY INDUSTRY" copies of which are available from UNIDO Vienna and any of the U.N. offices.

include detailed feasibility studies for manufacture and organization of production of selected items of agricultural equipment required by other countries as well.

8.4.3. It is necessary that INDA/INRA assist in carrying out feasibility studies on manufacture of one or more of the products mentioned in this report especially products identified in INDA/INRA Phase I of the activity may include:

1. Assessment of the size of domestic market and possible export sales.
2. In analysing and testing competing designs, sizes and types best suited to local conditions and production facilities.
3. Decisions on raw material selection, components to be locally manufactured and to be procured.
4. Submission of a detailed proposal for manufacture, requirements of buildings, balancing machines, financial analysis of the operation. etc.

Phase II of the activity may include start-up of production and continuing operational activities including development of sales-service net work and export promotion. A manufacturing programme so developed should serve as a model, the experience gained to be applied to other products or group of products.

A draft project-data sheet for a pre-project activity is given in Appendix -3).

8.5. Regional extension of marketing and manufacturing activities.

8.5.1. For achieving economical production of agricultural implements in the SMI, in addition to generation of internal demand, advance steps are required for assessing and developing an export market. The different countries in the region are developing their own manufacturing plans for agricultural equipment, where as, it is necessary that the investments already made and resources available for organizing production are fully utilised for a co-ordinated manufacturing and marketing activity.

The UNIDO-IDCAS conference referred to in para 8.4.2 had discussed the manufacturing activities of different Arab- countries for agricultural machines and implements and also identified spheres of co-operation. However, detailed studies and an action oriented programme is lacking.

8.5.2. It is recommended that a regional conference or Expert group meeting on development, production and marketing of agricultural equipment be planned early. This conference could be held in Baghdad to synchronise either with the Industrial Fair held in Baghdad in the month of October or the agricultural Fair that will be held in April every year. Exhibition of new agricultural machines developed and being developed in the region and in industrially developed countries would facilitate exchange of information and technology transfer.

8.5.3. The conference could be sponsored by UNIDO in co-operation with the Industrial Development Centre for Arab States and the Govt. of Iraq. Presentation of papers (on agricultural machinery population, trend in growth, agricultural development programmes, existing sources of supply, production and imports, agencies involved, price structure, incentives for local production, role and development of ancillary and complementary industries, sale and after sale service net work, institutions for research, development and testing, regional co-operation on production, development and marketing, supporting programmes for mechanisation) and deliberations of the conference would enable to identify spheres of co-operation. Based on this a UNIDO/IDCAS Mission which may include members from Iraq and one or two countries which had made progress in agricultural mechanisation could then visit selected countries to study and identify specific fields of co-operation, discuss its findings with the concerned Govt. authorities which may thus form a mutually agreed base for co-operative action.

8.5.4. In view of the time factor involved in organizing the activity as discussed above, as an immediate step, the Iskandariya management may collect information on demand, production etc of agricultural

implements as outlined in para 6.5.3. from neighbouring Arab countries and obtain information specifically on the sale potential of items included in the manufacturing programme as well as on such items as seed drills, tractor operated combine harvesters, and plant protection equipment. The programme for 1973, may include demonstration and trial of chosen equipment in 2 to 3 selected countries which would enable identifying priority fields of development and production for developing an export market, and simultaneous establishment effective channels through which export sales can be organised.

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**Estimated Net Area Under Different Crops Cens
in 1987 and Average Yields for the Years 1971-74
1987-89 and Preliminary Targets for 1991-94**

	1987-89		70 - 71/71 / 1		Preliminary Targets for 1991-94	
	Area in Hectares	Yield in kg/ha	Area in Hectares	Yield in kg/ha	Area in Hectares	Yield in kg/ha
WHEAT, BARLEY, OATS						
Wheat	6 247 000	119	3 750 200	216.0	30 025 000	200
Barley	4 677 000	170	1 504 300	272.0	4 205 000	250
LEGUMES, PULSES, SEEDS						
Lentils	64 633	100	27 043	160	26 900	170
Lup Broad Beans	27 005	170	23 500	110	23 000	100
Lup Chickens	60 302	263	70 505	235	170 000	250
Chick Peas	40 145	1 700	60 000	1 565	77 500	1 500
	10 332	166	19 751	170		
FRUIT, VEGETABLES						
Green Kidney Beans	41 004	1 300	63 300	1 564	170 000	(see notes on integrated vegetables)
Green Chickens	20 300	2 150	20 076	2 000		
Peas	5 314	2 500	4 220	2 507		
Tomatoes	12 961	2 670	12 700	2 301		
Cabbages	3 500	3 000	4 400	3 000		

1952/53-54/1

70 - 71/71 /1

1953/54-55/1

1954/55-56/1

	Area in Pounds	Ar. Yield in Tons	Area in Pounds	Ar. Yield in Tons	Area in Pounds	Ar. Yield in Tons	Area in Pounds	Ar. Yield in Tons
G. S. O. P.								
Chickens	1 861	2 640	2 463	2 719	642 000	642 000	642 000	642 000
2 Hens	5 948	1 593	5 701	1 402	205 000	205 000	205 000	205 000
Chick	7 105	1 735	8 787	1 732	88 000	88 000	88 000	88 000
Broilers	10 147	2 622	14 812	3 000	32 000	32 000	32 000	32 000
Butch	8 010	2 097	10 543	2 099	87 500	87 500	87 500	87 500
Quail	3 505	2 770	3 442	3 030	88 000	88 000	88 000	88 000
Quail House	3 133	1 095	2 609	1 207	5 500	5 500	5 500	5 500
Other Poultry (1954)								
Duck (Duck)	164 300	487	405 300	740	642 000	642 000	642 000	642 000
Goose	134 661	234	135 500	305	205 000	205 000	205 000	205 000
Swan	50 752	161	82 207	170	88 000	88 000	88 000	88 000
Wild Duck	25 145	201	22 242	277	32 000	32 000	32 000	32 000
Green Duck	47 100	230	61 000	144	87 500	87 500	87 500	87 500
Waterfowl (Swan)	14 753	250	37 475	487	88 000	88 000	88 000	88 000
Waterfowl (Duck)	25 640	209	44 302	301	5 500	5 500	5 500	5 500
Any One Poultry	25 535	252	18 742	257	7 000	7 000	7 000	7 000
Poultry (66)	570	300	200 200	370	205 000	205 000	205 000	205 000
Other	-	-	-	-	-	-	-	-
Other Poultry (1955)								
Swan	110 452	1 773	140 002	2 500	205 000	205 000	205 000	205 000
Goose	51 053	1 410	56 634	1 009	88 000	88 000	88 000	88 000
Any Poultry (Waterfowl)	37 617	6 636	42 050	2 571	88 000	88 000	88 000	88 000
Other Poultry	55 705	1 079	87 251	1 615	88 000	88 000	88 000	88 000

C R O P	1952/53-54		70 - 71/71 L1		Predicted Budget for 72-73/74 L2	
	Rs. in	kg. T/ha in	Rs. in	kg. T/ha in	Rs. in	kg. T/ha in
Sugarcane	28 417	2 281	29 279	2 408	-	-
Water Melon	188 945	2 774	211 811	2 728	-	-
Sweet Melon	64 048	2 176	75 967	2 336	-	-
Green Peppers	4 667	2 293	9 142	1 288	479 080	(includes only major amount vegetables).
Green Chilies	31 412	1 260	38 288	1 222	-	-
Other Crops	-	-	175 42	9 3 (ton)	152 080	43 700
Paper Cane	-	-	-	-	-	-
Melons & Berries	-	-	-	-	-	-
Sugar Beet	-	-	-	-	-	-

• Reference L1 Annual Abstract of Statistics 1971, Ministry of Planning - Govt. of India.
 L2 Drafting Agricultural Plans for 1973-94, Ministry of Agriculture and Agrarian Reform.

GENERAL SPECIFICATION OF EQUIPMENT TO BE INTRODUCED.

(All tractor operated implements should be suitable for use with Zetor 6711 and 8011 models which have category II, three point hitch and 6 splined 540 rpm P.T.O. shaft. Also see foot note P. 5.)

A. Land development and Drainage.

- A.1. **Elevator Scraper**- Power-take-off driven 4 to 5 cubic meter capacity, suitable for use with 60 to 80 hp wheeled tractors, equipped with hydraulic cylinders, hoses and couplings for adjusting height of cut, and for unloading.
- A.2. **Land plane** - With 2.7 to 3.5 m wide blade, trailed or semi-mounted, suitable for 50 to 80 hp tractors, blade angle adjustable, swiveling wheels, mechanical/hydraulic adjustment of depth of cut.
- A.3. **Drag scraper**- For 60 to 80 hp wheeled tractors, scraper capacity about 2.5 cubic meter, hydraulically controlled depth wheels, when converted into land plane distance of rear wheels not to be less than 3 meters.
- A.4. **Multi-purpose-blade leveller**. Tractor 3 point hitch mounted, with removable grader wheel, blade width 2.3 to 2.5 m., blade angle and tilt adjustable.
- A.5. **Loader digger-ditcher**- Tractor rear mounted for 70 to 80 hp wheeled tractors, hydraulically operated, with digging, grab and bulk loading buckets-minimum lift height 4 m, minimum reach at ground level 5 m., below ground level 3.5 m. Tear out force about 750kg. with hydraulically operated anchoring stands tractor front end and compensating loads suitable for clearing drains/ditches 2 to 2.5 m. deep with a bottom width of 1 to 1.5 m. and side slope of 1:1 and for other farm jobs.

B. Seedbed preparation

- B.1. Molcher or Subsoiling plough- Trailing type, 5 bottom, ploughing width 1.75 m, with automatic mechanical or hydraulic lifting device complete with land and furrow wheels suitable for ploughing depths up to 40 cm.
- B.2. Chisel plough/Heavy duty cultivators - Tractor 3 point hitch mounted with 9 to 13 heavy duty shanks, 3 point hitch mounted, fitted with heavy duty reversible shovels and duck foot shovels provided extra.
- B.3. Heavy duty trailed-offset disc harrow Suitable for 60 to 80 hp tractors fitted with 2 disc gangs, 610 mm (24 inch) width of cut 3 to 3.5 m, disc spacing 25 to 30 cm. with transport and height adjusting centrally mounted wheels, height adjustment through mechanical or hydraulic means and furrow fillers.

C. Planting.

- C.1. Trailed one way disc harrow- with seeding and fertilizing attachment. With adjustable hitch, 24 nos of discs of 560 mm diameter, gangs mounted with 6 discs per gang, matching grain and fertilizer box, feed tubes and boots.
- C.2. Seeding and fertilizing attachment fitted on 9-disc one way mounted disc harrow. - Discs 661 mm spaced at 254mm, gang angle adjustable in 5 steps from 36° to 46° with a maximum cutting width of 1.85 m with scrapers and fertilizing tubes, stand and accessories.
- C.3. Seeding and fertilizing attachment mounted on heavy duty 11 to 13 tined spring cultivators - With seed plates suitable for different sized seeds narrow reversible shovels or knife type furrow openers, row spacing to be adjustable.

- 0.4. Four row multi crop, tool bar mounted Unit-planters. - For planting whole and processed beet seed, beans, corn, cotton, peanut, sorghum and vegetable crops- 4 units mounted on 4 X 7 inch or equivalent tool bar package with gauge wheels, row spacing adjustable from 35 cm to 90 cm, runner type openers, planting depth adjustable from 0.5 cm to 9 cm with suitable hoppers, insecticide and herbicide attachment, irrigating shovels, gauge shoes, packer wheels, beet seed baffle and vegetable seed hopper.
- 0.5. Automatic 2 or 4 row potato planter with fertilizer attachment.- Suitable for tractor 3 point hitch mounting, row spacing adjustable from 70 to 80 cm, the feeding system to be suitable for both whole and cut potatoes.
- 0.6. Two row semi automatic mounted potato planter with fertilizing attachment mounted on ridger, with platform for seed boxes. Row spacing to be adjustable from 65 cm to 80 cm suitable for both ridging and planting.
- 0.7. Single wheel hand seeder - Suitable for medium and small seeds, with ridging, fertilizing and weeding attachments suitable for minimum row spacing of 20 cm.

B. Inter-cultivation

- D.1. Mounted four-row fertilizer cultivator with ridging bodies and weeding shovels suitable for row spacing up to 90 cm.

E. Harvesting and Threshing.

- E.1. Tractor side mounted P.T.O. operated combine harvester. Suitable for 60 to 80 hp wheeled tractors. Cutter bar width 2.5 to 3.5 m for harvesting wheat and barley and with suitable cylinders and sieves for rice, soybean, legumes and sorghum with bulk loading tank and self unloading discharge spout.

- E.2. Portable multi-crop thresher with housing attachment**-Suitable for wheat sorghum rice, barley, peas etc, fitted with 5 to 8 hp electric motor and extra belt pulley for adapting the thresher for tractor drive capacity 1 to 1.5 tons/hour
- E.3. Side delivery hay rake** - 3 point hitch mounted or semi-mounted tractor P.T.O. driven, raking width 2.5 to 3m.
- E.4. Tractor P.T.O. driven sick bar hay rake**. Trine type, with 540 rpm P.T.O. driven floating auger, over-running slip clutch, side hay resistors, bale chute extension, length of bale adjustable.

F. Feed harvest handling.

- F.1. Portable elevator conveyor 6 to 7 m long** - suitable for elevating feed material, shelled corn, grain, and medium sized bags with inside width of trough not less than 53 cm, flights spaced not less than 60 cm with receiving hopper, hand operated winches for adjusting height, carriage and wheels and 2 to 3 hp petrol engine.

G. Irrigation.

- G.1. Low lift high capacity single ^{stage} granular pump**. Complete with 3 m suction and 2 m long delivery sections, belt pulley suitable for coupling to tractor belt pulley-drive, shaft and pulley, capacity 5000 to 7000 gpm at 4 m head. Also integral electric motor mounted of 3000 to 5000 gpm capacity.
- G.2. High capacity mounted, P.T.O. driven centrifugal pump**. Complete with suction hose 2 m universal joint and coupling suitable for 1 1/8 inch splined P.T.O. shaft- capacity 2500 to 3000 gpm at 6 m head.

H. Flood protection.

- H.1. Tractor rear mounted P.T.O. driven sump** - Sump capacity 400 to 500 lit-

with built in strainers and agitator, pump to be corrosion resistant alloy, developing 250 to 350 psi, 3 to 4.5 m long spray boom, height adjustable, 14 to 19 nozzles, spray gun with 10 m hose, for use in orchard etc.

I. Miscellaneous Equipment.

- I.1. Podder cutters- manually operated - Fly wheel type with two self sharpening knives, automatic feeder and feed regulator, mounted on stand.
- I.2. Rotary power-saw-chopper, Tractor P.T.O. driven, with 1.5 to 2 m cutting width, with safety and over running clutch, blower, trailer hook, discharge spout and hood.
- I.3. Grinding mill, 0.5 to 1 ton capacity per hour, with receiving trough feed regulator, slung beaters, screens of different sizes, elevator and bagging attachment with 5 hp 3 phase 380/440 -V-electric motor.
- I.4. Stationary hand driven maize sheller - Manually operated with cleaning fan, ratchet type hand crank and pulleys for ^{adapting for} electric motor drive, capacity 100 to 200 kg per hour for hand operation 200 to 300 kg when power driven.
- I.5. Power operated maize shellers - With hopper, cleaning fan, capacity 3 to 5 tons per hour with electric motor, and pulleys for adapting for tractor belt pulley drive. Elevator and bagging attachment preferred.

Foot Note

Specifications are broad based. All the equipment to be complete in all respects in a ready to use condition. Equipment powered by electric motor should be suitable for 220 V, 50 cycle AC for single phase, or 380-440 V. AC. 50 cycle for 3 phase, complete with electric motor, starting switch etc. unless other wise indicated.

- Spare parts of the value of 10% of the cost of equipment or for first two years of use to be recommended extra.
- When there is a choice of models and optional accessories, prices of alternatives and accessories are necessary.

**UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION
UNITED NATIONS DEVELOPMENT PROGRAMME**

DRAFT PROJECT DATA SHEET

- Reference number Country: Iraq
1. Project title. Project elaboration and project report preparation (Manufacturing feasibility studies for agricultural implements)
 2. Date formal request recorded.
 3. Government department submitting the request. State Organisation for Engineering Industries
 4. Government agency concerned with the project. State Company for Mechanical Industries in Iskandariya.
 5. Description of the project. In order to prepare a comprehensive project report, a UNIDO team consisting of a UNIDO expert assisted by a UNIDO staff mission would carry out the following tasks.
 - (a) Identify product line/s that may be selected for a detailed manufacturing feasibility study
 - (b) In consultation with the concerned Government agency prepare a detailed project report for carrying out studies on local manufacturing potential; market survey, analysis of principal competitors brands through tests and trials where necessary, raw material selection, selection of component parts and assemblies to be produced locally or to be purchased etc., leading to:
 1. Proposal for manufacture; requirements of buildings, production facilities, personnel requirement, investment analysis and financial returns and investments,
 2. Recommendations for start-up of production, development of sales service net work and market expansion including export sales.
 - (c) Related to the above, to recommend strengthening and expansion of existing activities on testing, development and other supporting programmes for manufacture.
 6. Background information. The State Company for Mechanical Industries in Iskandariya has large surplus manufacturing capacity for agricultural implements. The Government is keen to utilise the surplus manufacturing capacity by including in the production programme items with good internal demand and export possibilities.

7. Relationship to other technical assistance projects.

U.N assistance is rendered to the Iskandariya industrial complex in the field of development and production of agricultural machinery. This is follow-up of a recommendation contained in report No. PJS 1/INA/15 (Project IRQ/72/015)

8. Project component, duration and estimated cost.

Field of activity.	DURATION	cost (U.S.D)
1. Mechanical Engineer (C)	1 m/m	3 000
2. UNIDO staff	1/2 m/m	1 500
	total	-----4 500-----

(C) Note. It is recommended that the mechanical engineering expert be Mr. P.J.Sacharish who is at present in the field.

9. Project approved.

For UNIDO ----- Date

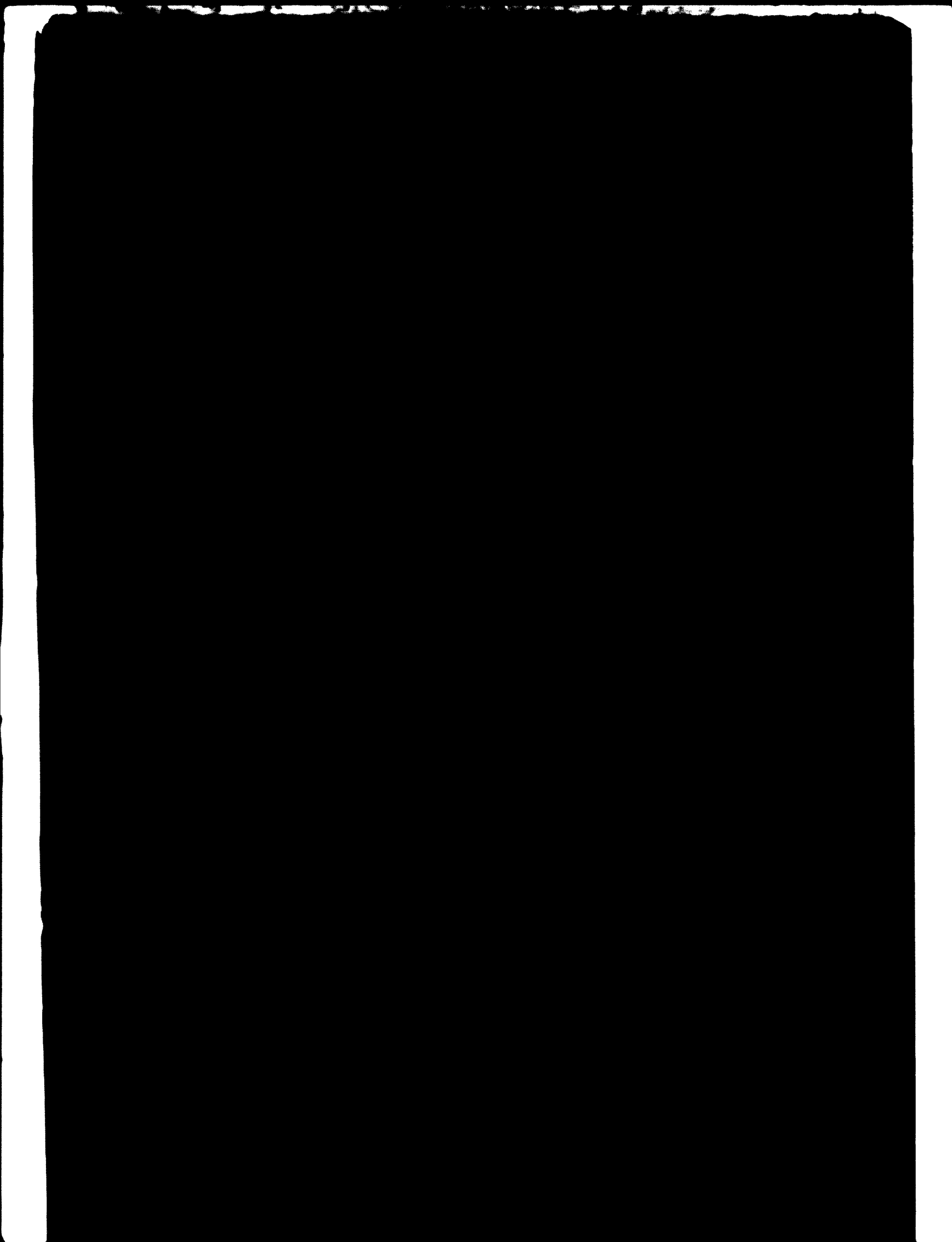
For UNDP. ----- Date

Appendix-4

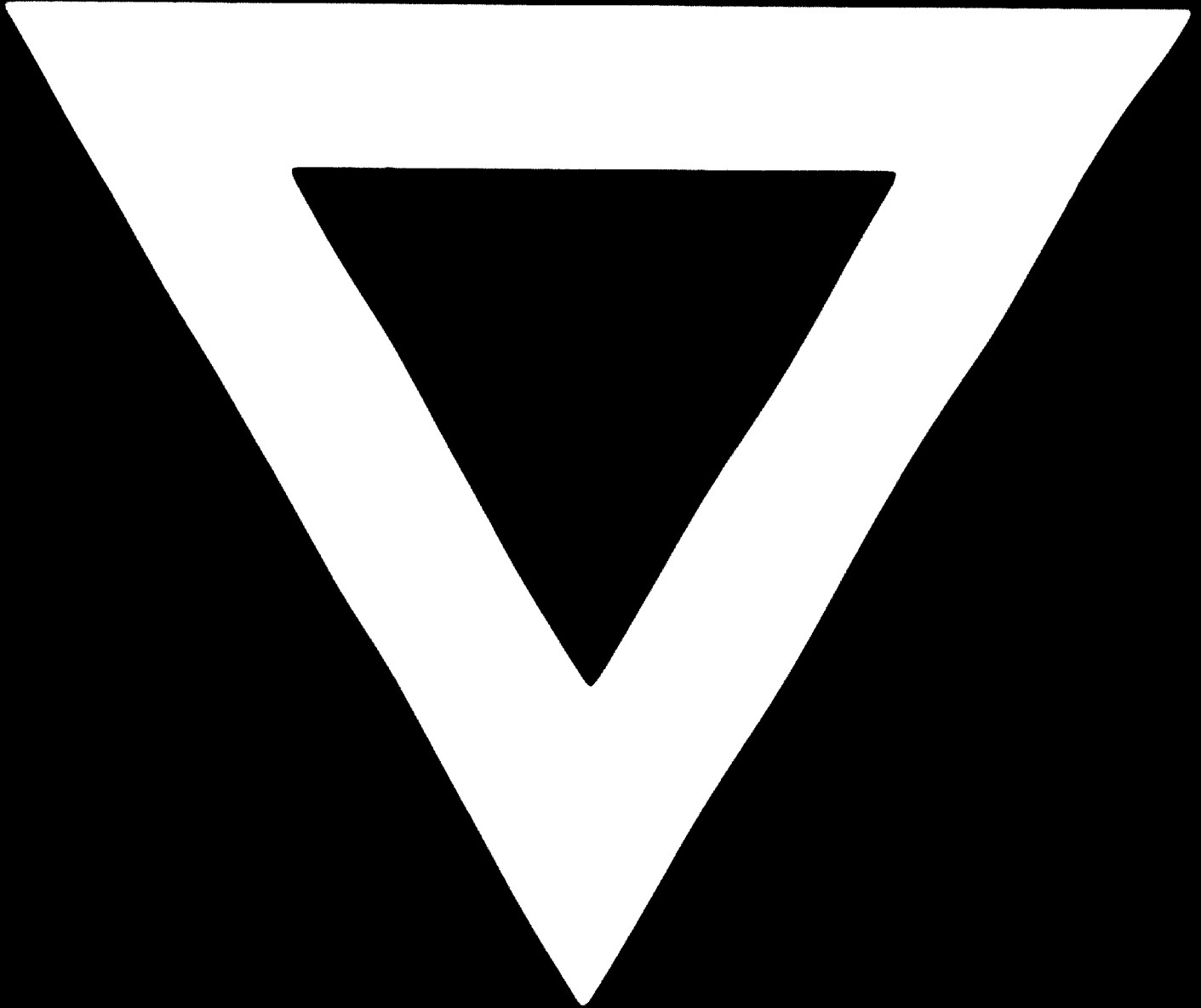
STATISTICAL METHODS AND INSTRUMENTS USED
IN 1962

	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	Sales by State
1. Plovers	752	680	637	697	735	745	539	549	285	339	179	639	
2. Gull-in-laws	446	357	387	348	395	216	243	295	164	47	131	133	
3. Blue Herons	5	144	108	102	190	190	34	146	27	-	100	-	
4. Kinglets	28	12	15	32	28	5	4	4	4	1	65	12	
5. Blue Jays	48	25	46	39	89	32	1	19	-	-	199	132	
6. White-throats	34	18	12	7	16	22	3	8	14	-	49	29	
7. Green Herons	3	19	1	3	24	18	1	-	-	-	-	-	
8. Red-wings	-	11	8	18	18	21	2	16	1	-	-	-	
9. Blue Jays	-	-	-	-	34	16	4	2	-	-	-	-	
Total	1959	1757	1133	1797	1392	1889	831	996	436	386	689	945	
10. Plovers	1989	842	849	1098	1033	1788	1084	1095	689	732	340	1346	
11. Gull-in-laws	253	219	263	436	138	102	249	246	164	15	-	-	
12. Blue Herons	187	434	185	192	286	174	47	113	185	218	-	-	
13. Kinglets	19	28	15	9	24	19	4	7	5	11	13	24	

Fig. Annual abstract of statistics - 1962 and 1972 and annual report of BBS for 1973-73.



C-932



82.11.04